CLAIMS

What is claimed is:

1. A communication receiver that is operable to receive a signal that is transmitted via communication channel, the received signal comprising a training sequence portion and a data portion, the communication receiver comprising:

a channel estimation block that is operable to estimate a characteristic of a communication channel; and

a channel equalizer block that is operable to calculate a plurality of channel equalizer tap coefficients, the plurality of channel equalizer tap coefficients being used to equalize for any communication channel-induced changes within the received signal; and

wherein at least one of the channel estimation block and the channel equalizer block performs repeated adaptation;

the channel estimation block being operate to employ repeated adaptation on the training sequence portion and the data portion, the repeated adaptation of the channel estimation block being performed using a plurality of channel estimation cycles; and

the channel equalizer block being operable to employ repeated adaptation on the training sequence and the data portion, the repeated adaptation of the channel equalizer block being performed using a plurality of channel equalizer cycles.

2. The communication receiver of claim 1, wherein the channel estimation block generates an estimate of the characteristic of the communication channel by performing repeated adaptation on the training sequence portion and the data portion using the plurality of channel estimation cycles; and

the channel equalizer block employs the estimate of the characteristic of the communication channel to perform direct calculation of the plurality of equalizer tap coefficients.

3. The communication receiver of claim 1, wherein the channel equalizer block calculates the plurality of equalizer tap coefficients by performing repeated adaptation on the training sequence portion and the data portion using the plurality of channel equalizer cycles.

4. The communication receiver of claim 1, wherein the communication receiver receives, as input, 'a priori' information that corresponds to the characteristic of the communication channel.

5. The communication receiver of claim 4, wherein the channel estimation block employs the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel estimation cycles.

6. The communication receiver of claim 4, wherein the channel equalizer block employs the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel equalizer cycles.

7. The communication receiver of claim 1, wherein the channel equalizer block comprises a decision feedback equalizer.

8. The communication receiver of claim 1, further comprising a buffer; and

wherein the communication receiver stores at least one of the training sequence portion and the data portion in the buffer; and

the communication receiver retrieves at least one of the training sequence portion and the data portion from the buffer during at least one of a channel estimation cycle and a channel equalizer cycle.

9. The communication receiver of claim 1, wherein the plurality of channel estimation cycles comprises a plurality of regions; and

wherein the channel estimation block performs region-dependent error handling using repeated adaptation on the training sequence portion and the data portion.

10. The communication receiver of claim 9, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

11. The communication receiver of claim 10, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

12. The communication receiver of claim 1, wherein the plurality of channel equalizer cycles comprises a plurality of regions; and

wherein the channel equalizer block performs region-dependent error handling using repeated adaptation on the training sequence portion and the data portion to calculate the plurality of channel equalizer tap coefficients.

13. The communication receiver of claim 12, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

14. The communication receiver of claim 13, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

15. The communication receiver of claim 1, wherein the communication receiver comprises a receive block that is contained within a transceiver.

16. The communication receiver of claim 1, wherein the communication receiver is contained within at least one of a base station receiver, a mobile receiver, a tower receiver, and a high definition television set top box.

17. A communication receiver that receives a signal, comprising:

a channel estimator;

a channel equalizer that is operable to calculate a plurality of channel equalizer tap coefficients, the plurality of channel equalizer tap coefficients being used to equalize for any communication channel-induced changes within the received signal, the channel equalizer operable to be selectively communicatively coupled to the channel estimator; and

wherein the communication receiver being selectively operable within a system identification mode and a channel equalizer mode;

within the system identification mode, the channel estimator employs repeated adaptation on the received signal to estimate a characteristic of a communication channel and then provides the channel estimate to the channel equalizer, the channel equalizer then performing direct calculation of the plurality of equalizer tap coefficients;

within the channel equalizer mode, the channel equalizer employs repeated adaptation on the received signal to calculate the plurality of equalizer tap coefficients;

the repeated adaptation of the system identification mode comprises a plurality of channel equalizer cycles; and

the repeated adaptation of the channel equalizer mode comprises a plurality of channel equalizer cycles.

18. The communication receiver of claim 17, wherein the received signal comprises a training sequence portion and a data portion.

19. The communication receiver of claim 18, further comprising a buffer; and

wherein the communication receiver stores at least one of the training sequence portion and the data portion in the buffer.

20. The communication receiver of claim 19, wherein the channel estimator retrieves at least one of the training sequence portion and the data portion from the buffer during a channel estimation cycle.

21. The communication receiver of claim 19, wherein the channel equalizer retrieves at least one of the training sequence portion and the data portion from the buffer during a channel equalizer cycle.

22. The communication receiver of claim 18, wherein the plurality of channel estimation cycles comprising a plurality of regions; and

wherein the channel estimator performs region-dependent error handling using repeated adaptation on at least one of the training sequence portion and the data portion within the system identification mode.

23. The communication receiver of claim 22, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

24. The communication receiver of claim 23, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

25. The communication receiver of claim 18, wherein the plurality of channel equalizer cycles comprising a plurality of regions; and

wherein the channel equalizer performs region-dependent error handling using repeated adaptation on at least one of the training sequence portion and the data portion within the channel equalizer mode.

26. The communication receiver of claim 25, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

27. The communication receiver of claim 26, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

28. The communication receiver of claim 17, wherein the communication receiver receives, as input, 'a priori' information that corresponds to the characteristic of a communication channel, the signal being transmitted to the communication receiver via the communication channel.

29. The communication receiver of claim 28, wherein the channel estimator employs the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel estimation cycles within the system identification mode.

30. The communication receiver of claim 28, wherein the channel equalizer employs the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel equalizer cycles within the channel equalizer mode.

31. The communication receiver of claim 17, wherein the channel equalizer block comprises a decision feedback equalizer.

32. The communication receiver of claim 17, wherein the communication receiver comprises a receive block that is contained within a transceiver.

33. The communication receiver of claim 17, wherein the communication receiver is contained within at least one of a base station receiver, a mobile receiver, a tower receiver, and a high definition television set top box.

34. A communication receiver that receives a signal that comprises a training sequence portion and a data portion, the communication receiver comprising:

a channel estimator;

a channel equalizer that is operable to calculate a plurality of channel equalizer tap coefficients, the plurality of channel equalizer tap coefficients being used to equalize for any communication channel-induced changes within the received signal, the channel equalizer operable to be selectively communicatively coupled to the channel estimator; and

wherein the channel estimator employs repeated adaptation on the received signal to estimate a characteristic of a communication channel and then provides the channel estimate to the channel equalizer, the channel equalizer then performing direct calculation of the plurality of equalizer tap coefficients based on the channel estimate provided by the channel estimator; and

the repeated adaptation performed by the channel estimator comprises a plurality of channel estimation cycles.

35. The communication receiver of claim 34, further comprising a buffer; and

wherein the communication receiver stores at least one of the training sequence portion and the data portion in the buffer.

36. The communication receiver of claim 35, wherein the channel estimator retrieves at least one of the training sequence portion and the data portion from the buffer during a channel estimation cycle.

37. The communication receiver of claim 34, wherein the plurality of channel estimation cycles comprising a plurality of regions; and

wherein the channel estimator performs region-dependent error handling using repeated adaptation on at least one of the training sequence portion and the data portion within the system identification mode.

38. The communication receiver of claim 37, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

39. The communication receiver of claim 38, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

40. The communication receiver of claim 34, wherein the communication receiver receives, as input, 'a priori' information that corresponds to the characteristic of a communication channel, the signal being transmitted to the communication receiver via the communication channel.

41. The communication receiver of claim 40, wherein the channel estimator employs the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel estimation cycles.

42. The communication receiver of claim 34, wherein the channel equalizer block comprises a decision feedback equalizer.

43. The communication receiver of claim 34, wherein the communication receiver comprises a receive block that is contained within a transceiver.

44. The communication receiver of claim 34, wherein the communication receiver is contained within at least one of a base station receiver, a mobile receiver, a tower receiver, and a high definition television set top box.

45. A repeated adaptation communication receiver method, comprising:

receiving a signal that is transmitted via a communication channel, the received signal comprising a training sequence portion and a data portion;

selectively estimating a characteristic of a communication channel using repeated adaptation on at least one of the training sequence portion and the data portion, the repeated adaptation of the selective channel estimation being performed using a plurality of channel estimation cycles; and

selectively calculating a plurality of channel equalizer tap coefficients using repeated adaptation on at least one of the training sequence portion and the data portion, the plurality of channel equalizer tap coefficients being used to equalize for any communication channel-induced changes within the received signal.

46. The method of claim 45, further comprising:

initially estimating the characteristic of the communication channel using the repeated adaptation on the at least one of the training sequence portion and the data portion; and

subsequently employing the estimated characteristic of the communication channel to perform direct calculation of the plurality of equalizer tap coefficients.

47. The method of claim 45, further comprising receiving, as input, 'a priori' information that corresponds to the characteristic of the communication channel.

48. The method of claim 47, wherein the selective estimating of the characteristic of the communication channel comprises employing the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel estimation cycles.

49. The method of claim 47, wherein the selectively calculating of the plurality of channel equalizer tap coefficients comprises employing the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel equalizer cycles.

50. The method of claim 45, wherein the selectively calculating a plurality of channel equalizer tap coefficients is performed using a decision feedback equalizer.

51. The method of claim 45, further comprising:

storing the at least one of the training sequence portion and the data portion in a buffer; and

retrieving the at least one of the training sequence portion and the data portion from the buffer during at least one of a channel estimation cycle and a channel equalizer cycle.

52. The method of claim 45, wherein the plurality of channel estimation cycles comprising a plurality of regions; and

wherein the selective estimating of the characteristic of the communication channel comprises performing region-dependent error handling using repeated adaptation on the training sequence portion and the data portion.

53. The method of claim 52, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

54. The method of claim 53, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

55. The method of claim 45, wherein the plurality of channel equalizer cycles comprising a plurality of regions; and

wherein the selectively calculating of the plurality of channel equalizer tap coefficients comprises region-dependent error handling using repeated adaptation on the training sequence portion and the data portion.

56. The method of claim 55, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

57. The method of claim 56, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

58. The method of claim 45, wherein the method is performed in a receive block, the receive block is contained within a transceiver.

59. The method of claim 45, wherein the method is performed in at least one of a base station receiver, a mobile receiver, a tower receiver, and a high definition television set top box.

60. A repeated adaptation communication receiver method, comprising:

receiving a signal that is transmitted via a communication channel, the received signal comprising a training sequence portion and a data portion;

initially estimating a characteristic of a communication channel using repeated adaptation on the training sequence portion and the data portion, the repeated adaptation of the selective channel estimation being performed using a plurality of channel estimation cycles; and

subsequently employing the estimated characteristic of the communication channel to perform direct calculation of a plurality of equalizer tap coefficients, the plurality of equalizer tap coefficients being used to equalize any communication channel-induced changes within the received signal.

61. The method of claim 60, further comprising receiving, as input, 'a priori' information that corresponds to the characteristic of the communication channel.

62. The method of claim 61, wherein the selective estimating of the characteristic of the communication channel comprises employing the 'a priori' information that corresponds to the characteristic of the communication channel to modify an end condition of at least one of the channel estimation cycles.

63. The method of claim 60, wherein direct calculation of the plurality of equalizer tap coefficients being calculated using a decision feedback equalizer.

64. The method of claim 60, further comprising:

storing at least one of the training sequence portion and the data portion in a buffer; and

retrieving at least one of the training sequence portion and the data portion from the buffer during a channel estimation cycle.

65. The method of claim 60, wherein the plurality of channel estimation cycles comprising a plurality of regions; and

wherein the estimating of the characteristic of the communication channel comprises performing region-dependent error handling using repeated adaptation on the training sequence portion and the data portion.

66. The method of claim 65, wherein one region within the plurality of regions comprises a number of iterations, a step size, and a threshold.

67. The method of claim 66, wherein at least one additional region within the plurality of regions comprises the number of iterations and a step size smaller than the step size of the one region.

68. The method of claim 60, wherein the method is performed in a receive block, the receive block is contained within a transceiver.

69. The method of claim 60, wherein the method is performed in at least one of a base station receiver, a mobile receiver, a tower receiver, and a high definition television set top box.